



PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Industrial Truck Attachment

We, CLARK EQUIPMENT COMPANY, a corporation organized and existing under the laws of the State of Michigan, United States of America, having a principal place of business in the City of Buchanan, Michigan, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates generally to an industrial truck attachment, and more specifically is directed to a load support side shifting attachment for masted lift trucks.

It is an object of the present invention to provide an improved load support side shifting attachment construction which is well suited for use with masted trucks.

Another object of the invention is to provide a load support side shifting attachment for masted lift trucks which is improved in smoothness of operation and which is of a construction which greatly facilitates assembly and alignment of the parts.

A further object of the invention is to provide a load support side shifting attachment of construction which permits improved visibility by an operator of the lifting means or fork tines through and around portions of the attachment.

Another object of the present invention is to provide an attachment of the type contemplated which is more economical to manufacture than prior constructions for a similar purpose, and which is relatively simple to assemble, maintain and mount for operation on lift trucks.

Other objects, advantages and features of the invention will appear from the following detailed description taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a front view in perspective showing the attachment in a partially raised position on the upright of a lift truck;

FIGURE 2 is an enlarged view in front elevation showing the construction of the attachment removed from the lift truck and the fork tines removed from the attachment; and

FIGURE 3 is a side elevational view of the construction shown in FIG. 2 with the fork tines attached.

Referring now in detail to the drawings, the front chassis portion of an industrial lift truck is indicated generally at numeral 10; it includes a drive axle 12 connected to front drive wheels 14 and a front body portion 16. A telescoping upright construction which includes a pair of outer fixed channel members 18 supported for pivotal movement on bearing portions of axle 12 and a pair of nested I-beam sections 20 mounted for vertical movement in channels 18, supports the attachment of the present invention shown generally at numeral 22 including a pair of fork tines 24. An upright hydraulic cylinder and piston assembly 26 is supported from the bottom of channels 18 and is suitably connected in conventional manner to attachment 22 by means of a pair of chains 28 for elevating attachment 22 in movable upright sections 20, and upright sections 20 in channels 18.

The attachment 22 of our invention is supported from a pair of vertically spaced and transversely extending fork bars 30 which are supported by fork brackets and rollers, not shown, in a well-known manner on movable upright sections 20.

In the interest of clarity, the front view of the attachment construction is shown without fork tines 24 or fork bars 30 being illustrated. A vertical transversely extending adaptor plate 32 has a generally rectangular configuration with a central cut-out portion 34 and a downwardly extending bracket portion 36 located adjacent the right-hand side thereof as viewed in FIG. 2. Plate 32 is supported from the upper notched edge 38 of upper fork bar 30 by a rearwardly extending com-

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plementary notched bracket 40 which is secured to the rear surface of plate 32, and is secured adjacent the lower edge thereof to said upper fork bar by a pair of recessed bolts 42.

5 Secured to the upper edge of adaptor plate 32, as by welding, is a transversely extending cylinder 44 which extends slightly beyond either end of plate 32 and which includes a grease seal and wiper portion 46 and suitable bushing 47 at each end thereof. A continuous shaft 48 is received in cylinder 44 and extends substantially beyond opposite ends thereof when it is centred therein, as shown in FIG. 2. Adjacent each end portion of shaft 48 is a circumferential groove 50 which receives a rearwardly opening U-shaped connector plate 52 which is secured by a pair of recessed bolts 54 to the upper end of a downwardly depending side plate 56 having an opening 58 for receiving the respective end of shaft 48. A vertical transversely extending front support plate 60 having cut-out portions 62 and 64 therein is secured, at the opposite ends thereof, as by welding, to the inner surfaces of side plates 56. A bracket 66 is secured to the rear surface of support plate 60 and extends into the space behind the left end of cut-out 64 for receiving a transversely adjustable bifurcated end 68 of a piston rod 70 which comprises the actuating member of a double-acting hydraulic cylinder motor 72. Bifurcated end 68 has an aligned opening through each side thereof which is also alignable with an opening through bracket 66 for receiving a pin 74, whereby to pivotally anchor piston rod 70 on support plate 60. The end of cylinder 72 opposite piston rod 70 is pivotally supported by a pin and block 76 to the downwardly depending bracket portion 36 of adaptor plate 32. Hydraulic hose adaptors 78 are connected at opposite ends of cylinder 72 to which are connected pressure hoses 80 which extend upwardly and centrally of the attachment and thence to a support plate 82 which is secured by bolts 83, as shown, to the upper fork bar 30. Hoses 84 connect with hoses 80 at support plate 82 and thence extend to operator control valve means, not shown, which directs pressure fluid to one or the other ends of actuator cylinder 72. It will be noted that couplers 78 extend rearwardly on a bias from the wall of cylinder 72 and behind a drop portion 86 of cut-out 64, the angled position of the hydraulic couplers and the forward drop portion of the support plate 60 tending to protect the couplers and base from damage during load handling operations of the vehicle.

A bracket member 88 is secured to the rear face of support plate 60 and extends downwardly a short distance from the lower edge thereof. A rearwardly extending bracket portion 90 is secured by a plurality of recessed

bolts 92 to member 88 and registers with a complementary notched bracket portion formed in the lower edge of lower fork bar 30. Similar notched bracket portions are formed in the upper and lower edges of support plate 60 for receiving complementary bracket portions of bracket members 94 and 96 which are secured to the rear face of each of the pairs of fork tines 24. A pair of transversely spaced lower support roller means 100 is mounted in openings 102 of support plate 60 by means of a pair of rectangular plates 104 each having an opening 106 receiving a roller 100 for rotation on a vertical pin 108 mounted in openings central of the plate 104. Each plate 104 is secured by a pair of recessed bolts 110 to support plate 60, whereby said latter plate is adapted during assembly to be pivoted with side plates 56 on shaft 48 into a position such that rollers 100 abut lower fork bar 30 and bracket 90 is located in registry with the lower portion of said fork bar, the support and side plate assembly with shaft 48 being fully supported in a vertical direction by cylinder 44, adaptor plate 32, upper fork bar 30 and chains 28 in upright channels 20, and in a horizontal direction by the abutment of rollers 100 with lower fork bar 30.

It will now be understood that the entire construction is assembled and mounted in an extremely compact manner on fork bars 30 of the lift truck, and that prior problems of alignment of parts in side shifting attachments are avoided by the construction which provides a pivotal support of the entire support plate assembly 56 and 60 from cylinder 44, whereby the support plate assembly will seek a position wherein rollers 100 are always in abutment with the forward surface of lower fork bar 30. Adaptor plate 32 provides a unique intermediate plate construction supported from the upper fork bar 30 and providing a relative light weight plate in comparison with support plate 60, said adaptor plate providing the anchor portion 36 for actuator cylinder 72 and the support for tube 44.

Energization of said actuator cylinder by way of either of hoses 80 causes piston 70 to extend or retract relative to cylinder 72 from the centered position thereof shown in FIGS. 1 and 2. When the piston rod extends this causes support plate 60 with side plates 56 and shaft 48 to be actuated leftwardly with fork tines 24 as rollers 100 roll along the front face of lower fork bar 30. Retraction of piston rod 70 causes side shifting movement of the support plate assembly with shaft 48 in the opposite direction. A grease fitting, not shown, is preferably connected to tube 44; the tube may be filled with grease so that lifetime lubrication is afforded shaft 48, thereby aiding to effect an extremely smoothly operating side shifter attachment.

As will be now readily appreciated by persons skilled in the art, smoothness of operation, economy and simplicity of construction and assembly, and ready alignment of the parts, are each facilitated by our invention. In addition, the visibility of the truck operator through the various openings provided in the construction is greatly improved over prior constructions of the type contemplated.

Although only one embodiment of our invention has been illustrated and described, it will be apparent to those skilled in the art that changes in the structure and relative arrangement of parts may be made to suit individual requirements without departing from the scope of the invention.

WHAT WE CLAIM IS:—

1. In an industrial truck having an upright mast and transverse bar means mounted for elevating movement in the mast, a load support side shifting attachment comprising a transversely extending adaptor plate supported from said bar means, a transverse tube secured to the upper end of said adaptor plate, a shaft mounted for reciprocation in said tube and extending longitudinally beyond either end of said tube, a pair of downwardly depending side plates secured to opposite end portions of said shaft, a transverse support plate secured to said side plates below said tube and shaft and forwardly of said adaptor plate, and motor actuator means connected to said adaptor plate and to said support plate for actuating said support plate laterally in either direction relative to said adaptor plate.

2. An attachment as claimed in claim 1 wherein said actuator means includes a hydraulically actuated cylinder-piston motor connected at one end to said adaptor plate, and at the other end to said support plate, said support plate providing a transversely extending opening receiving a portion of said cylinder.

3. An attachment as claimed in claim 1, wherein a pair of transversely spaced roller means are mounted in said support plate, the periphery of each roller means extending rearwardly of said support plate and abutting said bar means.

4. In an industrial truck having a lifting mast supported on one end thereof and a pair of vertically spaced and transversely extending support bars mounted in said mast for elevation, a load support side shifting attachment comprising an intermediate plate member fixedly secured to the upper bar and having a transversely extending hollow member secured to the upper portion thereof, a load support plate mounted forwardly of said intermediate plate for transverse movement relative thereto, said mounting including an elongated member received in said hollow member and extending beyond the ends thereof and a pair of downwardly extending plate members secured to opposite ends of said

elongated member and to opposite sides of said support plate, said support plate extending substantially beyond said intermediate plate in a direction transverse of said truck and extending substantially below said intermediate plate, and actuator means connected between said intermediate and support plates for actuating said support plate transversely with said side plates and elongated member relative to said intermediate plate and hollow member.

5. An attachment as claimed in claim 4 wherein a transverse cut-out is formed in said support plate, said actuator means comprising a cylinder-piston assembly connected at one end to said intermediate plate and at the opposite end to said support plate and being partially received within said cut-out.

6. An attachment as claimed in claim 4 wherein a pair of transversely spaced roller means are mounted in the lower portion of said support plate and extend rearwardly thereof in abutment with the forward surface of the lower one of said support bar.

7. In a lift truck having a lifting mast mounted at one end thereof, a load support side shifting attachment mounted for elevating movement in said mast comprising a pair of transversely extending and vertically spaced bar members, an intermediate plate secured to and mounted forwardly of said upper bar member and having a transversely extending guide tube secured to the upper portion thereof, a support plate mounted forwardly of said intermediate plate of greater length than said intermediate plate and extending below said intermediate plate, said support plate being supported from said intermediate plate by a pair of vertically extending side members which extend above said support plate and a transverse shaft, of greater length than said guide tube, received in said guide tube and connected at its opposite end portions to said pair of side members, and actuator means connected to said intermediate plate and to said support plate for actuating said support plate with said shaft transversely of said guide tube and intermediate plate.

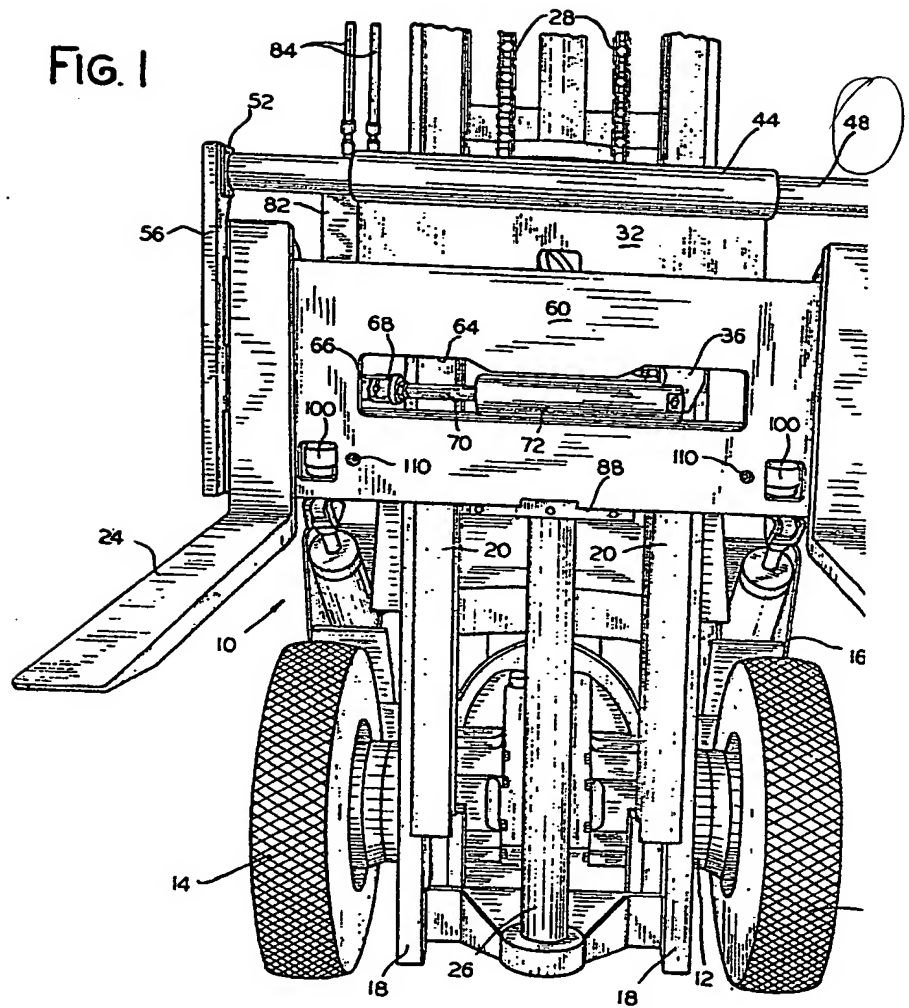
8. A load support side shifting attachment for a masted lift truck comprising a rear plate, an intermediate plate supported from said rear plate, and a forward load support plate supported from said intermediate plate, said intermediate plate having a transverse guide member secured thereto, and mounting means connecting said forward support plate to said guide member including vertical members secured to and extending above said forward plate and a transversely extending member connected to said side plate members and mounted for reciprocation in said guide member, and actuating means connected to said forward support plate for actuating same with said transversely extending member transversely of said intermediate plate.

9. An attachment as claimed in claim 2 wherein a vertically extending opening extends through said adaptor plate, and pressure fluid conduit means extends through said opening and is connected to said cylinder-piston motor. 15
10. An attachment as claimed in claim 2 wherein at least a portion of said transversely extending opening in said support plate is located below the lower transversely extending side of said adaptor plate, and a downwardly extending bracket portion of said adaptor plate which extends downwardly into the horizontal plane of said transversely extending opening, said bracket portion supporting one end of said cylinder-piston motor. 20
11. An attachment as claimed in claim 10 wherein said cylinder-piston motor extends longitudinally of said transversely extending opening.

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FIG. 1

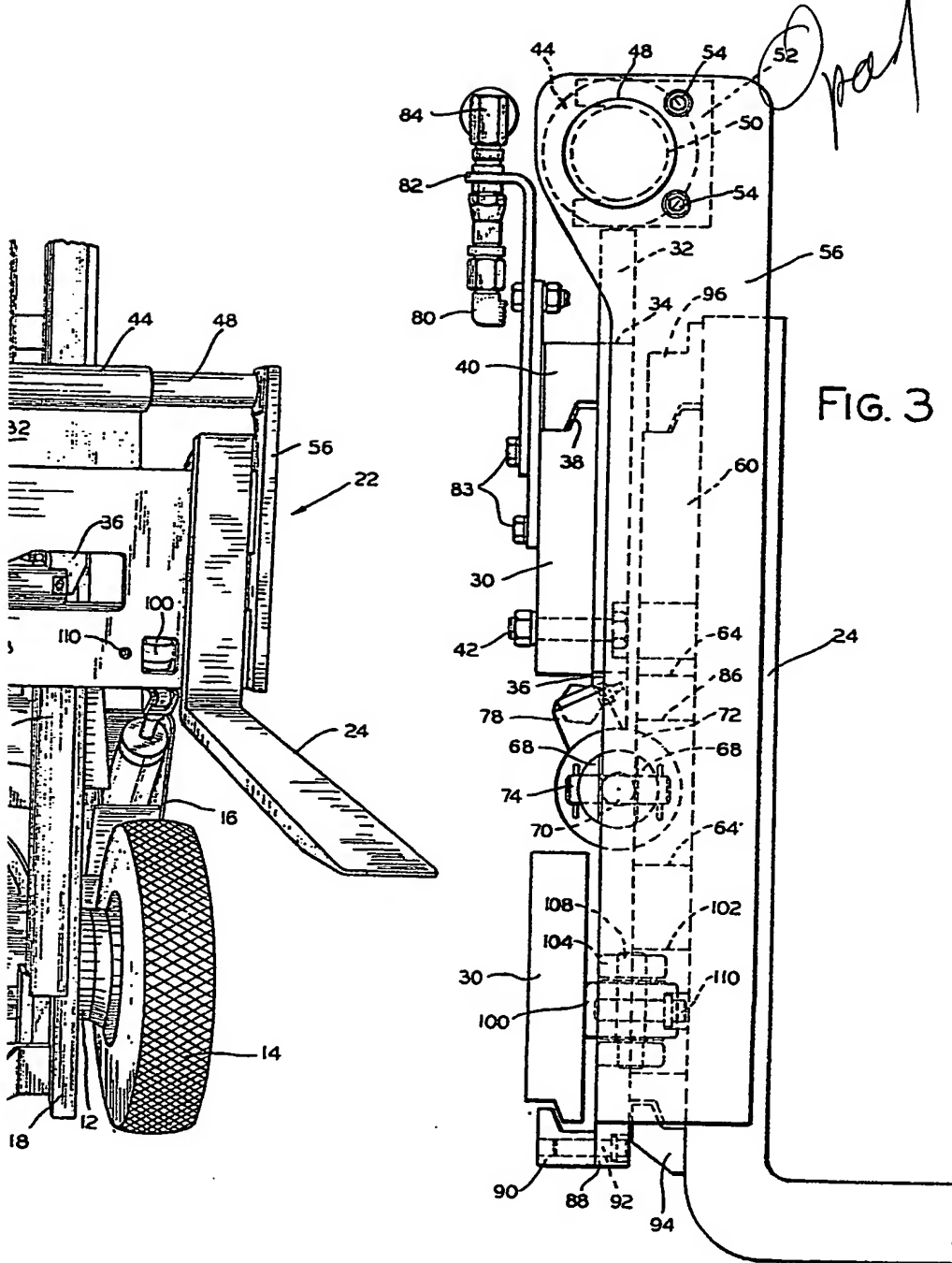


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2 SHEETS

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Sheet 1



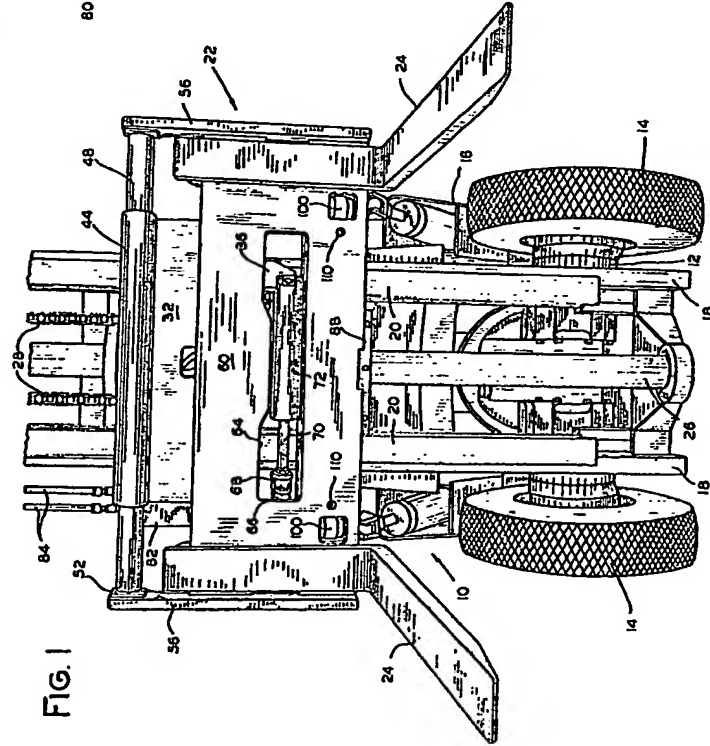


FIG. 1

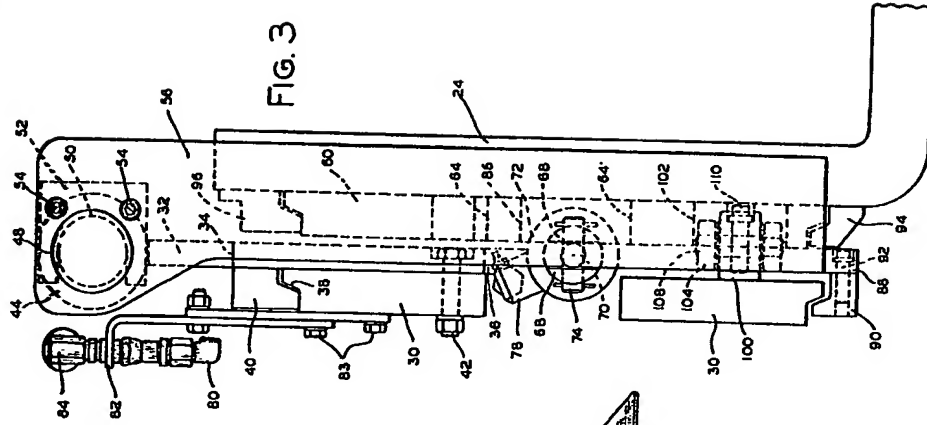
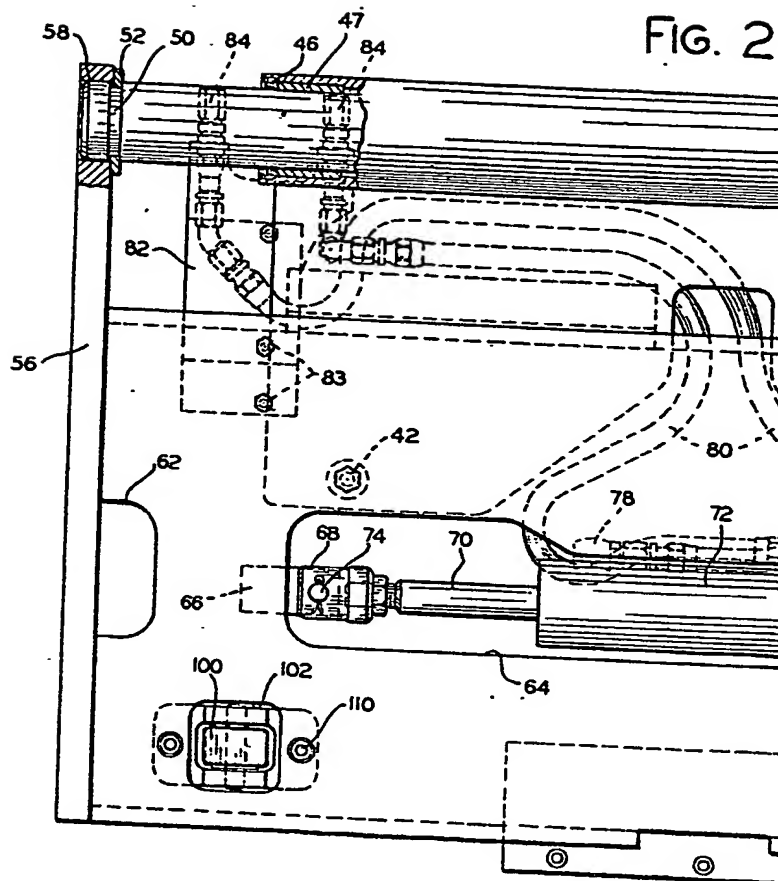


FIG. 3

FIG. 2



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Sheet 2*

FIG. 2

